2011 International Workshop-Noordwijk,Netherlands

Global Collaboration in Environmental and Alternative Energy Strategies

Ultraviolet Radiation Control Methods

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Agenda

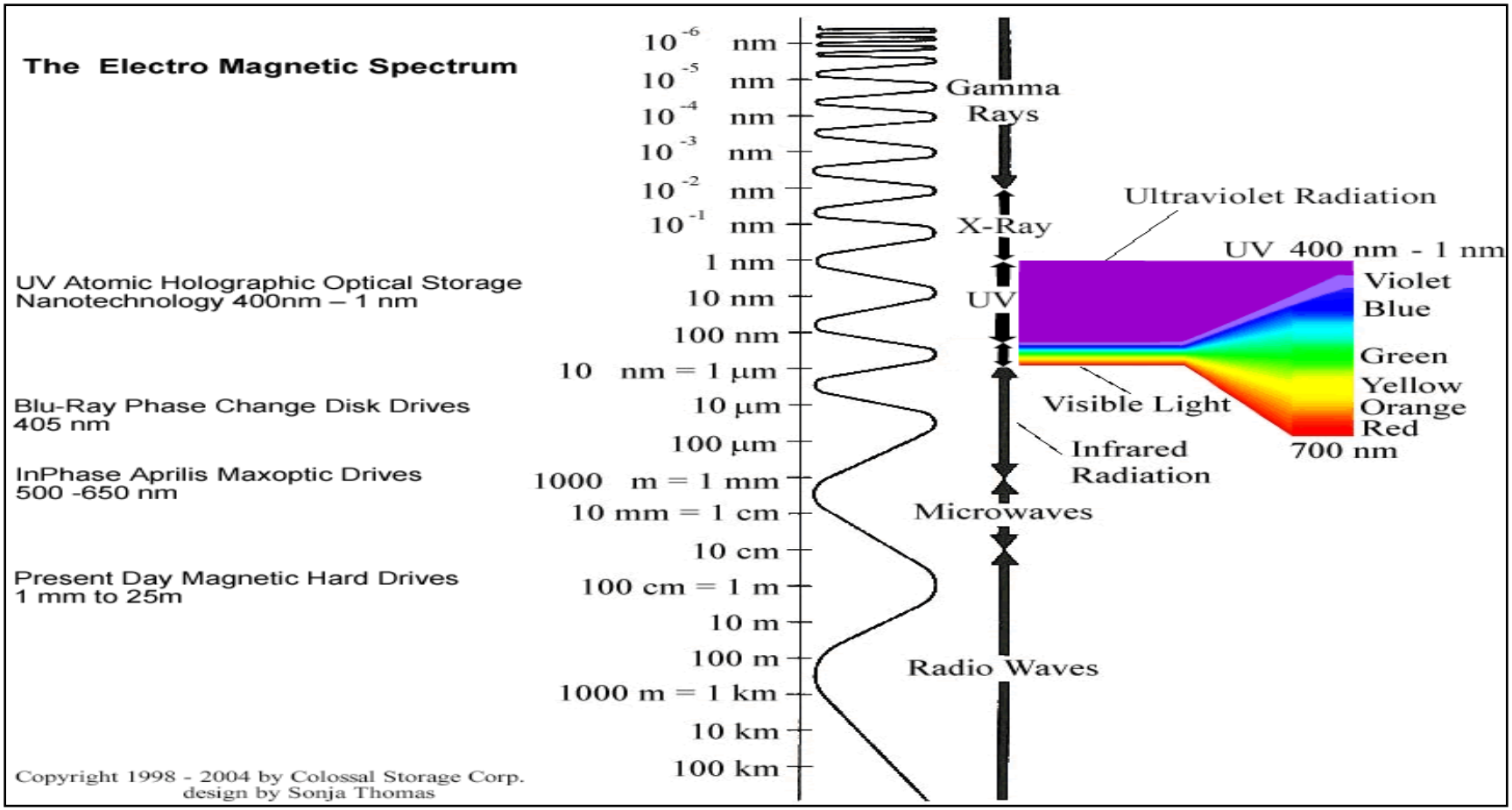
- Introduction
- Types of Ultraviolet rays
- Sources of UV rays
- UV rays detectors
- Harmful Effects of UV rays
- Prevention methods
- Conclusion

Introduction

Ultraviolet (UV) radiation

- Ultraviolet radiations is a form of electromagnetic radiation, like radio waves, x-rays and light.
- It is named as Ultraviolet light because the spectrum consists of electromagnetic waves with frequencies higher than those that humans identify as the color violet.
- It has higher energy than visible light and lower wavelength about 100-400nm.

Wave range of UV rays



Thanks:- science.jrank.org

Types of UV rays

UVA

- These rays are mostly responsible for pigmentation of skin on humans.

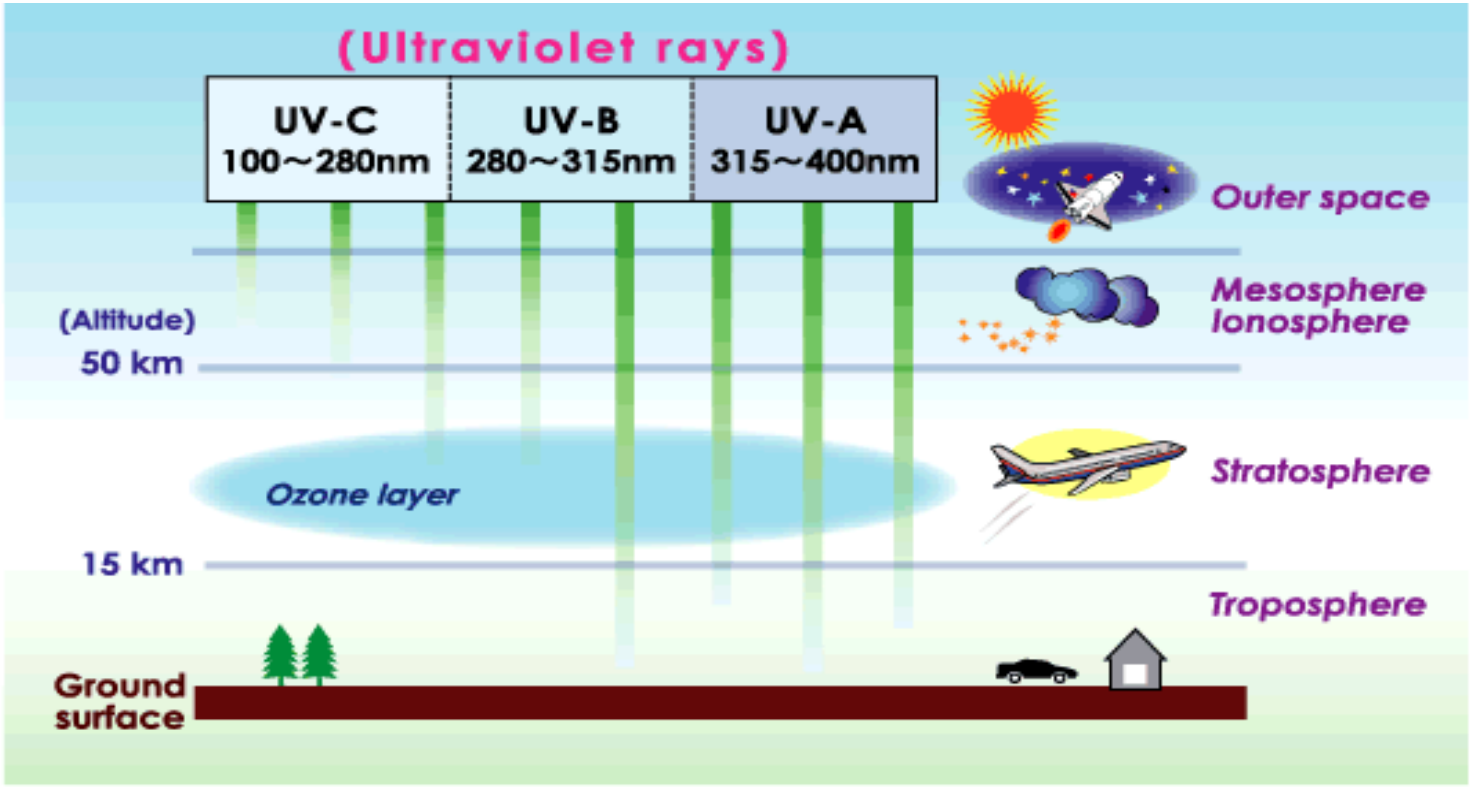
UVB

- Most potentially harmful, causes sunburns and can lead to skin cancer.

UVC

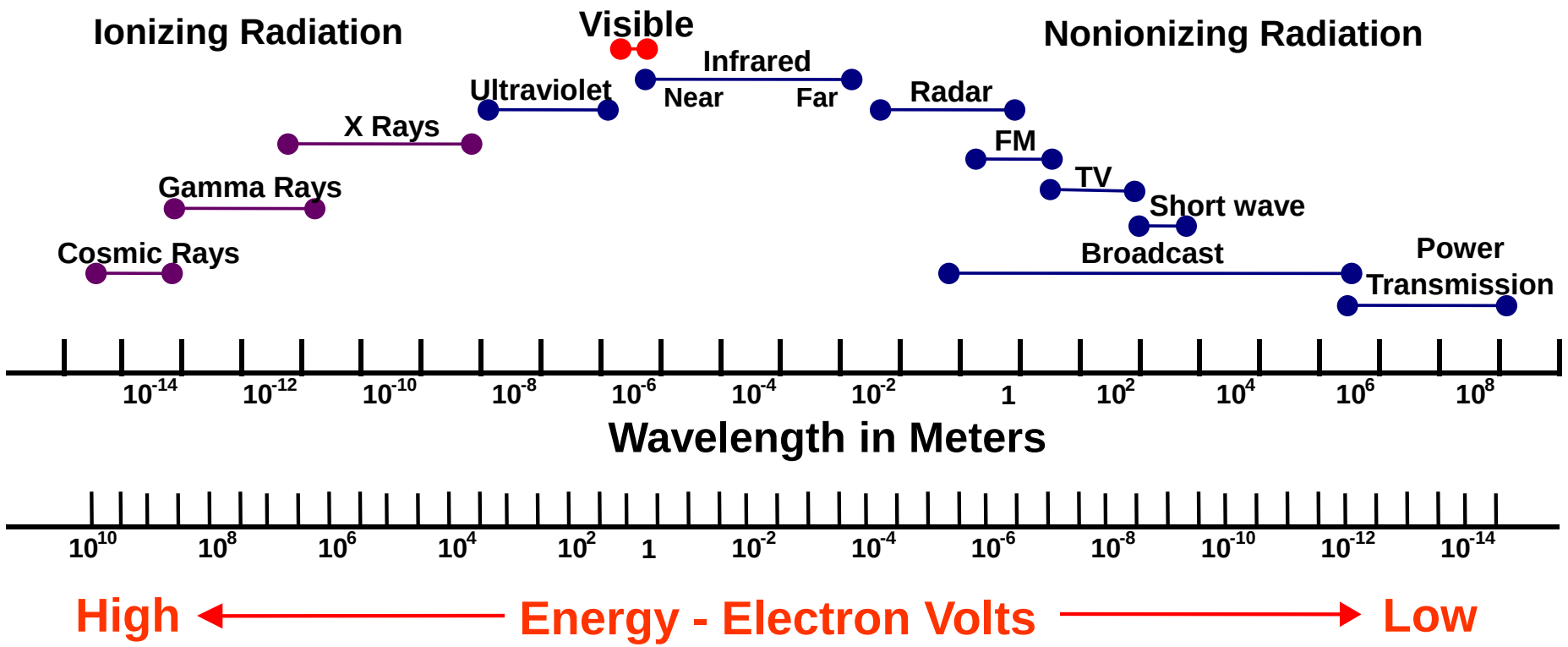
- Absorbed by air, does not reach the Earth, but can be emitted from other sources such as fluorescent lights.

Types of UV rays



Thanks - wikispace (Electromagnetic spectrum)

Electromagnetic Spectrum



Ultraviolet Rays source

Natural

- Sun
- Lightning

Artificial

- Electric Welding arcs
- UV curing lamps
- Black lights
- UV lasers
- Tanning lamps

Satellites

- Solar Ultraviolet Spectral Irradiance Monitor(SUSIM)
  - This SUSIM will monitor and examine the UV rays.
- The Solar Radiation and Climate Experiment (SORCE)
  - NASA-sponsored satellite mission.
  - Measures incoming x-ray, ultraviolet, visible, near-infrared, and total solar radiation.

UV rays detectors

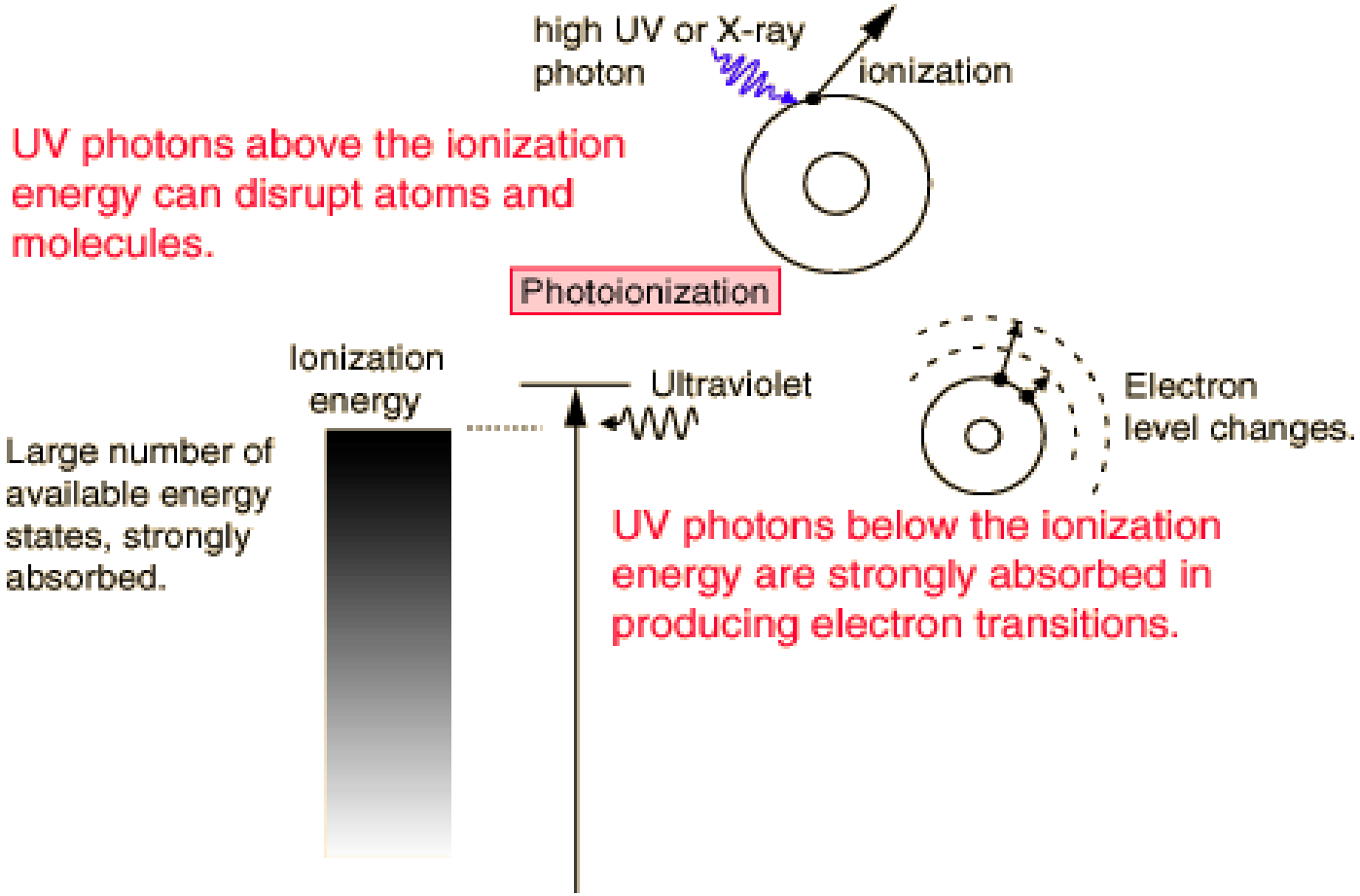
Source - azooptics photonics

- Gallium Nitride(GaN) UV sensors
- UV datalogger
- Photodiodes
- GaN Photo diodes

UV rays detectors

Thanks:- International Radiation Detectors, Inc.

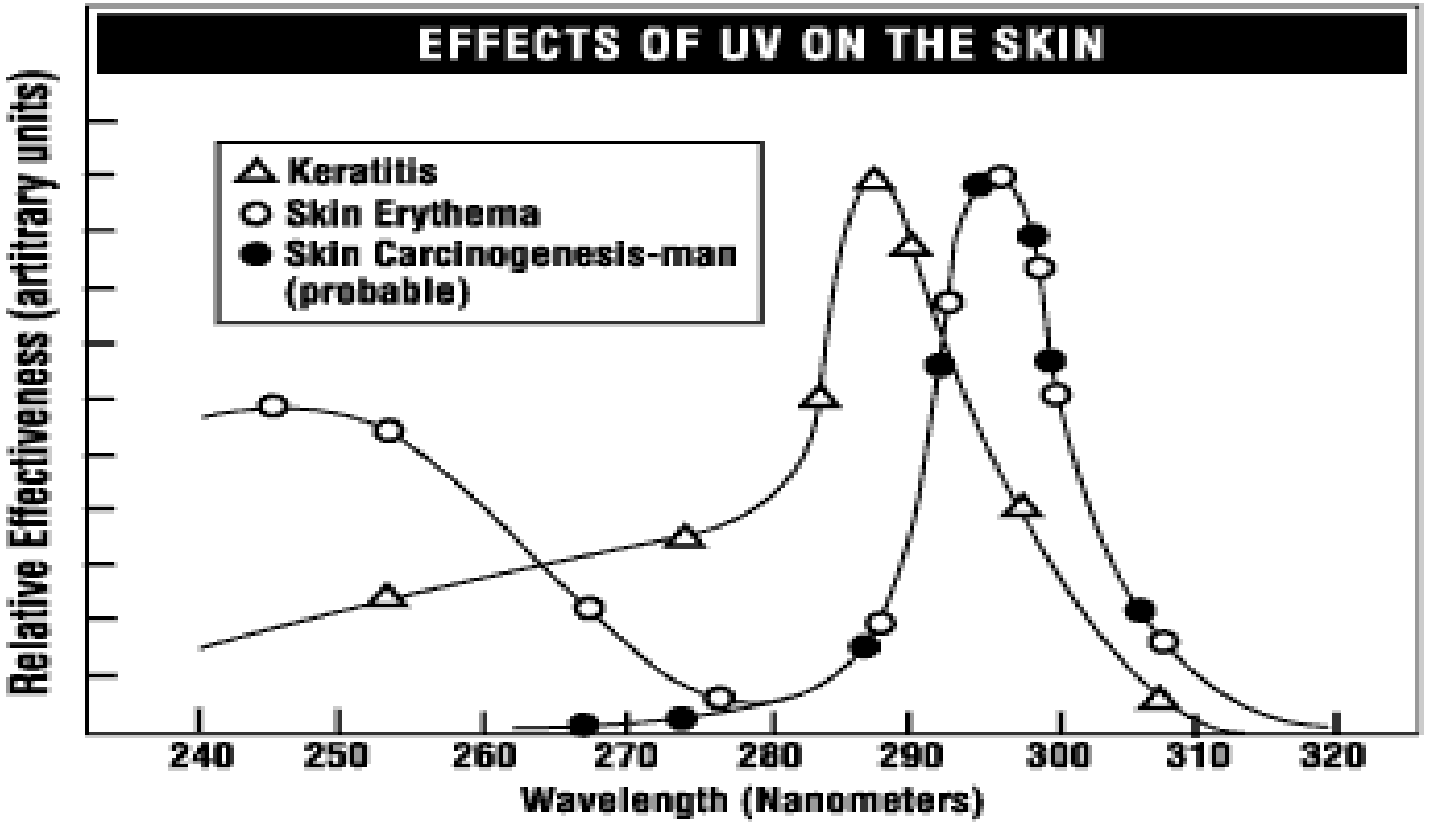
Ultraviolet Interactions



Harmful Effects of UV rays

- Sun burn
- Welder's Flash
- Retinal burn
- Skin Cancer
- Photo aging
- Cataracts

Harmful Effects of UV rays



Thanks - Canadian Centre for Occupational Health and Safety

Methods to prevent UV

- Oxygen Ozone method
- Using Nano particles
- Personnel protection

Oxygen Ozone method

- Liquid oxygen will be carried to the stratosphere.
- It is released as gas because more volume of oxygen is stored as liquid than as gas.
- It is done using the aerostats and aerodynes.

Oxygen Ozone method

- The aerodyne tank capacity should hold around 200m^3 of liquid oxygen.
- The liquid that is vaporized will be ejected under high pressure from the aerodyne.
- Oxygen gas ejected will join naturally with existing ozone molecules.

Oxygen Ozone method

- Discharged oxygen will add to the total volume of ozone at depleted places and join in reaction.

- Oxygen ozone is formed to protect the harmful effect of UV.

Oxygen Ozone method

Measurement of ozone layer

- The amount of ozone are often described in terms of thickness of ozone in column of air stretched from earth surface.
- The most common measurement of total ozone values in the column are called Dobson's unit (DU).
- One DU is equal to number of molecules of ozone that will create pure ozone layer of 0.01mm thick.

Nanosolar panels

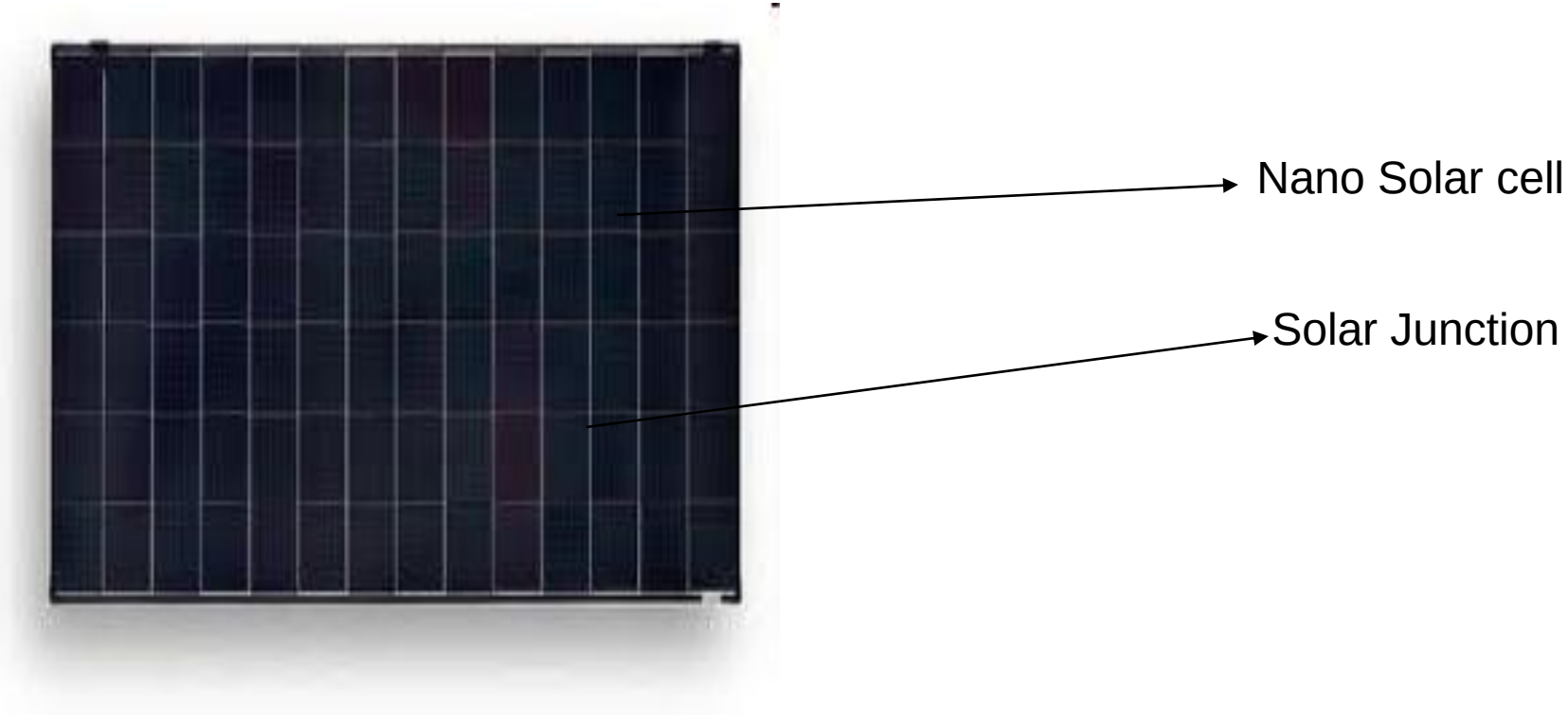
- The Nano technology can be implemented in solar panels.
- In this technique solar panels are being replaced by Nano materials.
- These Nanopanels will reduce the complexity when compared to ordinary solar panels.

Nanosolar panels

- CIGS (Copper, Indium, Gallium, Selenium) are the semiconductors that are used in these panels.
- They are coated with the Nano materials by spraying the Nano inks over the panels.

Nanosolar Panel

Nanosolar panel



Nanosolar panels

- By annealing and printing process, thin film semiconductor is made.
- Nanoparticles dispersed throughout the proprietary CIGS ink.

Nanosolar panel

- Titanium dioxide nanotubes filled with a polymer
  - To form low cost solar cells.
- Combining lead selenide quantum dots with titanium dioxide
  - To form higher efficiency solar cells.
- Combining carbon nanotubes bucky and balls and polymers
  - Produce inexpensive solar cells that can be formed by simply painting a surface.

Personnel Protection

Limit Time in the Midday Sun

Seek Shade

Cover Up

Wear a Hat

Wear Sunglasses

Use Sunscreen

Avoid Tanning Parlors

Watch for the UV Index

SunWise

Conclusion

By taking the necessary steps, we can control these harmful radiations thereby exceeding our life in this earth.

May all have the peaceful standard of living with environment eco friendly relationship.

Acknowledgement

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Thank You...

Questions

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